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Alba 232

1866

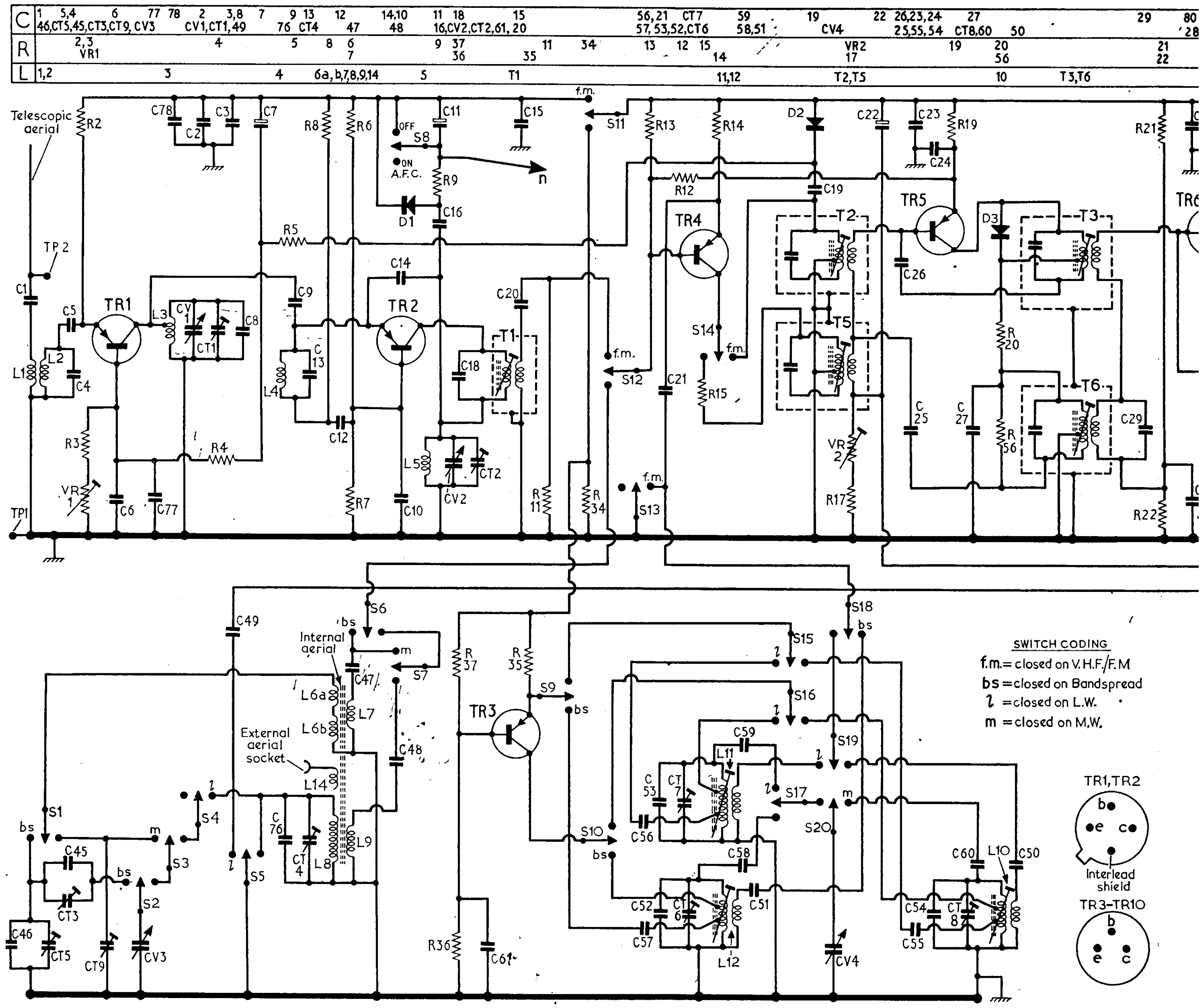
A.M./F.M. transistored portable radio receiver

Introduction

Incorporating ten transistors and eight crystal diodes, the Alba model 232 a.m./f.m. portable radio receiver features a.f.c. on v.h.f./f.m.; a two position tone control; scale lamp operated by a press-button switch, and piano key switch operation for waveband selection. Four waveband ranges are covered and are as follows: 86·5-108Mc/s (v.h.f./f.m.); 188-216m (bandspread at high frequency end of medium wave); 187-566m (m.w.), and 857-2,000m (l.w.).

For v.h.f. reception a telescopic aerial is fitted, an internal ferrite rod aerial being used for m.w./l.w./b.s., this also has a gimmick wire coupling from an aerial socket for reception via an external aerial.
(Continued overleaf col. 1)

Resistors			R12	33kΩ	B2
			R13	56kΩ	B1
R2	330Ω	B2	R14	1kΩ	A1
R3	68kΩ	B2	R15	1kΩ	B2
R4	1·2kΩ	B2	R17	33kΩ	B2
R5	5·6kΩ	B2	R18	5·6kΩ	A2
R6	1·8kΩ	B1	R19	1kΩ	B2
R7	6·2kΩ	B1	R20	100Ω	B2
R8	2·2kΩ	B1	R21	5·6kΩ	A2
R9	68kΩ	B1	R22	22kΩ	A2
R10	100kΩ	A2	R23	1·2kΩ	A2
R11	82kΩ	A1	R24	150Ω	A2


C 1 5,4 6 77 78 2 3,8 7 9 13 12 14,10 11 18 15 56,21 CT7 59 19 22 26,23,24 27 29 80
46,CT5,45,CT3,CT9,CV3 CV1,CT1,49 76 CT4 47 48 16,CV2,CT2,61,20 57,53,52,CT6 58,51 CV4 25,55,54 CT8,60 50 28
R 2,3 VR1 4 5 8 6 7 9 37 36 11 35 34 13 12 15 14 VR2 17 19 20 56 21 22
L 1,2 3 4 6a,b,7,8,9,14 5 T1 11,12 T2,T5 10 T3,T6
Telescopic aerial
TP2
TP1
TR1
TR2
TR3
TR4
TR5
TR6
D1
D2
D3
A.F.C.
OFF
ON
f.m.
bs
m
l
Internal aerial
External aerial socket
SWITCH CODING
f.m.= closed on V.H.F./F.M
bs = closed on Bandspread
l = closed on L.W.
m = closed on M.W.
TR1,TR2
b e c
Interlead shield
TR3-TR10
b e c

Component values and locations

R25	2·2kΩ	A2
R26	1kΩ	A2
R27	270Ω	A2
R28	1kΩ	A2
R29	10kΩ	A2
R30	3·3kΩ	A2
R31	5·6kΩ	A2
R32	5·6kΩ	A2
R33	1kΩ	A2
R34	1·8kΩ	A1
R35	1kΩ	A1
R36	27kΩ	A2
R37	4·7kΩ	A1
R38	1·5kΩ	C2
R39	47kΩ	C2
R40	10kΩ	C2
R41	3·9kΩ	C2
R42	1·2kΩ	C1
R43	18kΩ	C1
R44	4·7kΩ	C2
R45	56Ω	C2
R46	390Ω	C1
R47	220Ω	C2
R48	1kΩ	C2
R49	33Ω	C2
R50	1kΩ	C2
R51	33Ω	C2
R52	1·5Ω	C2
R53	1·5Ω	C2
R54	82kΩ	C2
R55	100Ω	C1
R56	150kΩ	B2
VR1	100kΩ	B2
VR2	100kΩ	A2
VR3	10kΩ	‡

Capacitors

C1	30pF	B2
C2	0·04µF	B2
C3	0·04µF	B1
C4	80pF	B2
C5	0·01µF	B2
C6	1,000pF	B2
C7	5µF	B2
C8	5pF	B2
C9	3pF	B2
C10	1,000pF	B1
C11	0·1µF	B1
C12	500pF	B2
C13	30pF	B1
C14	3pF	B2
C15	0·04µF	B1
C16	8pF	B2
C17	0·01µF	A2
C18	15pF	B1
C19	10pF	B2
C20	5,000pF	B1
C21	0·01µF	A1
C22	5µF	B2
C23	0·04µF	A2
C24	0·04µF	B2
C25	3pF	B2
C26	5pF	B2
C27	200pF	B2
C28	0·04µF	A2
C29	1,000pF	A2
C30	0·04µF	A2
C31	6pF	A2
C32	200pF	A2
C33	30pF	A2
C34	0·01µF	A2
C35	5,000pF	A2
C36	1µF	A2
C38	0·04µF	A2
C39	0·01µF	A2
C40	200pF	A2
C41	5µF	A2
C42	200pF	A2
C43	5µF	A1
C44	200µF	C2
C45	20pF	A1
C46	4pF	B1
C47	4,000pF	B1
C48	0·01µF	B1
C49	0·04µF	A1
C50	0·01µF	A1
C51	0·01µF	A1
C52	10pF	A2
C53	100pF	A2
C54	10pF	A2
C55	5,000pF	A1
C56	0·01µF	A1
C57	5,000pF	B1
C58	20pF	A1
C59	200pF	A1
C60	330pF	A1
C61	0·01µF	A2
C62	0·1µF	C1
C63	1µF	C1
C64	30µF	C1
C65	5µF	C1
C66	30µF	C1
C67	200µF	C1
C68	200µF	C2
C69	5,000pF	C2
C70	5,000pF	C2
C71	200µF	C2
C72	200µF	C2
C73	0·04µF	A2
C74	0·04µF	A2
C76	15pF	B2
C77	1,000pF	B2
C78	0·04µF	B2
C80	0·04µF	B2
C81	0·02µF	B2
CV1	—	A2
CV2	—	A2
CV3	—	A2
CV4	—	A2
CT1	—	B2
CT2	—	B2
CT3	—	B2
CT4	—	B2
CT5	—	A1
CT6	—	B2
CT7	—	A1
CT8	—	A1
CT9	—	A1

Coils

L1		—	B1
L2		—	B1
L3		—	B2
L4		—	B1
L5		—	B2
L6	a	—	A1
	b	—	B1
L7		—	B1
L8		—	C1
L9		—	C1
L10		—	A2
L11		—	A1
L12		—	B1
L13		—	C1
L14		—	B1
L15		8Ω	B2

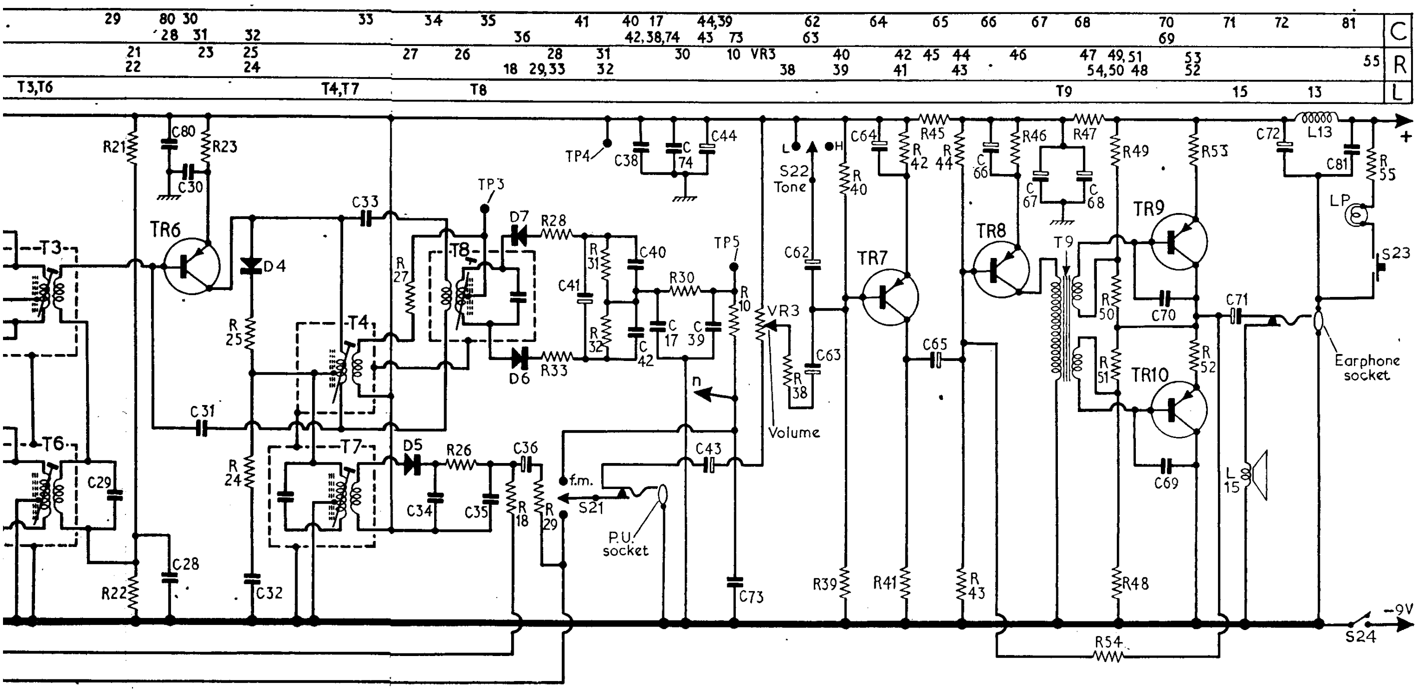
Transformers

T1	—	B1
T2	—	B2
T3	—	A2
T4	—	A2
T5	—	B2
T6	—	A2
T7	—	A2
T8	—	A2
T9	—	C2

Miscellaneous

D1	IS553	B1
D2	IS188	B2
D3	IS188	B
D4	IS188	A2
D5	IS188	A2
D6	IS188	A2
D7	IS188	A2
S1-S7, S9-S21		A1
S8	—	**
S22	—	†
S23	—	††
S24	—	§
LP	—	—

** *A.f.c. switch.*
† *Tone control.*
†† *Pilot lamp.*
§ *On/off, ganged with volume control.*
‡ *Volume control.*



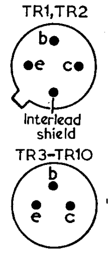
Circuit diagram of the Alba 232 a.m./f.m. radio receiver.

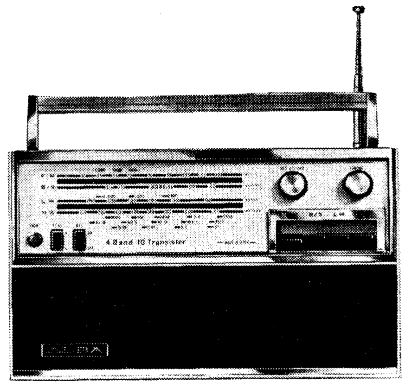
H CODING
on V.H.F./F.M
on Bandspread
on L.W.
on M.W.

Transistor table

Transistor		F.M. Emitter (V)	Base (V)	Collector (V)	A.M. Emitter (V)	Base (V)	Collector (V)
TR1	2SA440	6·6	6·0	—	2·0	4·0	—
TR2	2SA440	5·5	5·2	—	1·8	1·5	—
TR3	2SA203	—	—	—	5·6	5·4	—
TR4	2SA321	5·6	5·0	0·2	6·1	5·6	0·2
TR5	2SA321	6·2	5·8	0·1	5·8	5·4	0·1
TR6	2SA321	5·7	5·3	0·1	5·3	4·9	0·1
TR7	2SB186	6·0	5·5	3·8	5·7	5·2	3·5
TR8	2SB186	5·7	5·4	0·3	5·5	5·2	0·3
TR9	2SB272	—	8·8	4·5	—	8·8	4·5
TR10	2SB272	4·5	4·3	0	4·5	4·3	0

Quiescent current 20mA.





1866
Alba 232

Continued from overleaf—

Two miniature jacks situated at the lower left-hand side of the case provide the means for connection of a pick-up and earphone. Both are switched so that radio or loudspeaker are muted when the appropriate plug is inserted. An audio power output of 1W (maximum) is handled by a 4in dia. 8Ω loudspeaker. Operational power being supplied by six type LPU2 batteries or their equivalents.

Transistor analysis

Transistor voltages given in table, overleaf, were obtained from information supplied by the manufacturers. They were measured under no signal conditions with an Avometer model 8, and are all positive relative to the negative supply line.

Circuit alignment

Equipment required. – An a.m. r.f. signal generator covering the range 140kc/s-2Mc/s; an r.f. coupling coil; an output meter to match 8Ω terminated with a miniature jack plug; an r.f. coupling coil; an f.m. sweep generator; an oscilloscope (c.r.o.); one each 0·01 µF and 0·1 µF capacitors, and a shunt diode rectifier network made up with a 2,000pF capacitor, an OA79 diode and a 33kΩ resistor (see illustration).

Switch on test equipment and allow about 15 minutes to warm up. Preset volume control to maximum, and connect audio output meter via earphone jack. Loosely couple r.f. coupling coil to ferrite rod aerial, all a.m. r.f. signals are fed via this source. Maintain input signal at a level just sufficient to give an accurate indication on the output meter without introducing a.g.c. action.

1. – Switch receiver to m.w., rotate tuning gang to maximum capacitance, and feed in a 470kc/s a.m. signal. Adjust **T7, T6** and **T5** in that order for maximum output.

2. – Check that with the tuning gang at maximum capacitance the cursor is coincident with the marker located near the left-hand end of the f.m. tuning scale. Tune receiver to 550m, and feed in a 545kc/s a.m. signal. Adjust **L10** and **L6a** for maximum output.

3. – Tune receiver to 200m, and feed in a 1,500kc/s a.m. signal. Adjust **CT8** and **CT9** for maximum output.

4. – Switch receiver to b/s. (bandspread), tune to 216m, and feed in a 1,388kc/s a.m. signal. Adjust **L12** and **CT3** for maximum output.

5. – Tune receiver to 190m, and feed in a 1,579kc/s a.m. signal. Adjust **CT6** and **CT5** for maximum output.

6. – Switch receiver to l.w., tune to 1,900m, and feed in a 158kc/s a.m. signal. Adjust **L11** and **L8** for maximum output.

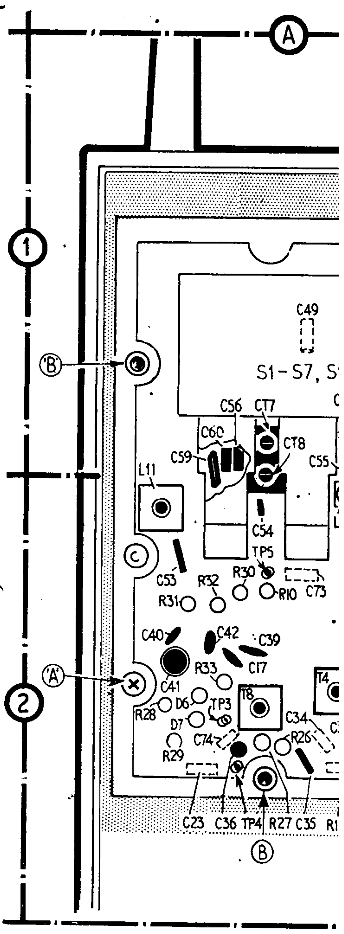
7. – Tune receiver to 900m, and feed in a 333kc/s a.m. signal. Adjust **CT7** and **CT4** for maximum output. This completes the alignment of the a.m. circuits.

8. – Switch receiver to v.h.f./f.m. and tune to a signal-free position in the waveband. Connect the f.m. sweep generator via a 0·01 µF capacitor to TP2 and TP1 (common). Connect the c.r.o. via the diode network between TP3 and chassis, and detune **T8.**

9. – Feed in a 10·7Mc/s signal, deviated 300kc/s at 50c/s. Adjust **T4, T3, T2** and **T1** for maximum amplitude, symmetrical about 10·7Mc/s. Attenuate input signal so that curve amplitude is just large enough to produce a pattern.

10. – Disconnect and remove diode network and connect c.r.o. via a 0·1 µF capacitor to, between TP5 and chassis.

11. – Feed in a 10·7Mc/s signal, deviated 300kc/s at 50c/s. Adjust **T4** for a symmetrical 'S' curve, and **T8** to centre 10·7Mc/s marker in the straight portion of the curve. Disconnect c.r.o.



Rear view illustration of the receiver showing the component side of the printed panels. The shunt diode rectifier network as described under "Circuit alignment" is seen in location ref B1.

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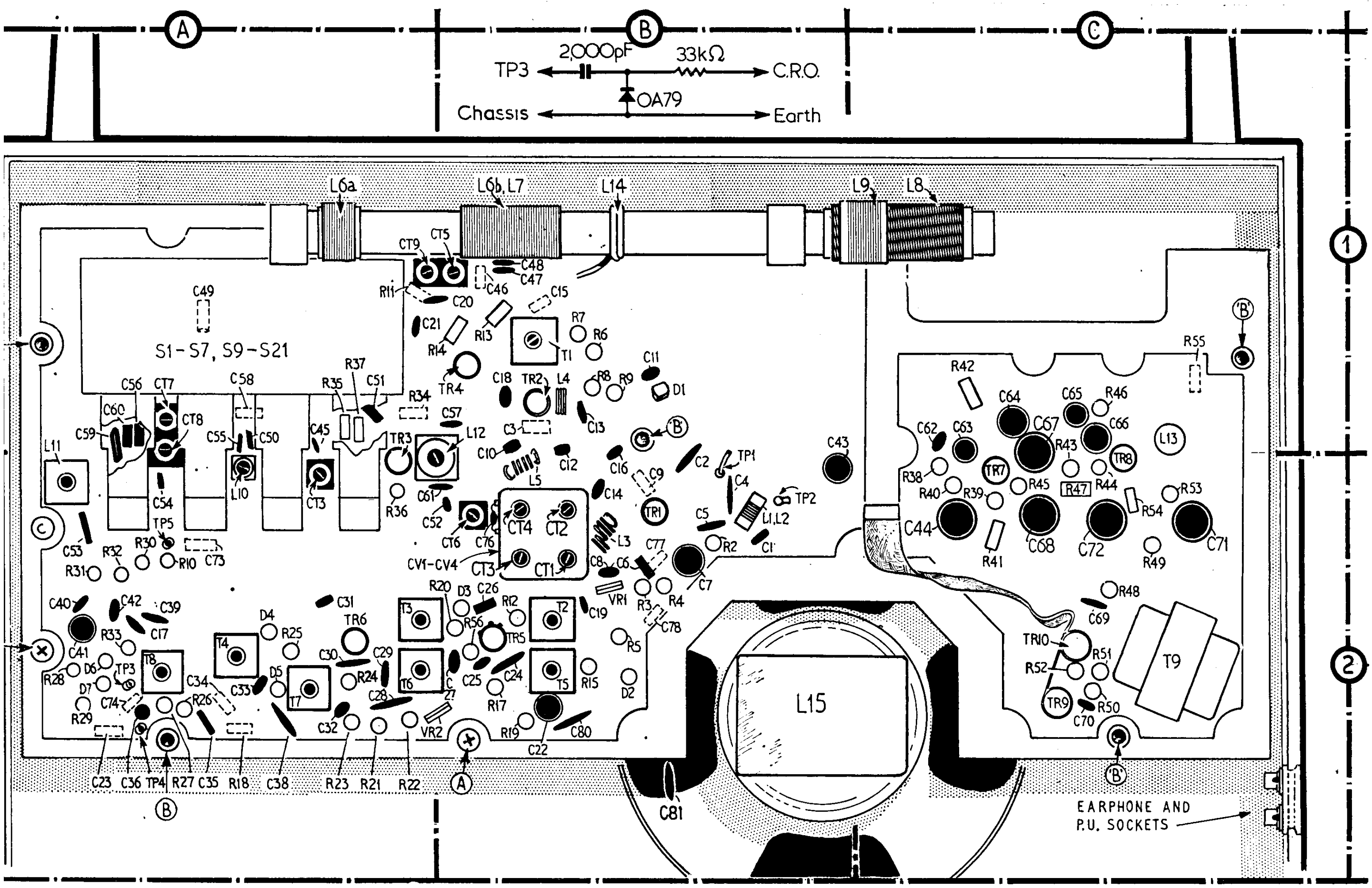


12. – Tune receiver to 87Mc/s, connect audio output meter via earphone jack, preset volume control to maximum, and feed in an 87Mc/s signal, deviated 25kc/s at 1kc/s. Adjust **L5** and **L3** for maximum output.

13. – Tune receiver to 108Mc/s, and feed in a 108Mc/s signal, deviated 25kc/s at 1kc/s. Adjust **CT2** and **CT1** for maximum output. Disconnect and remove test equipment.

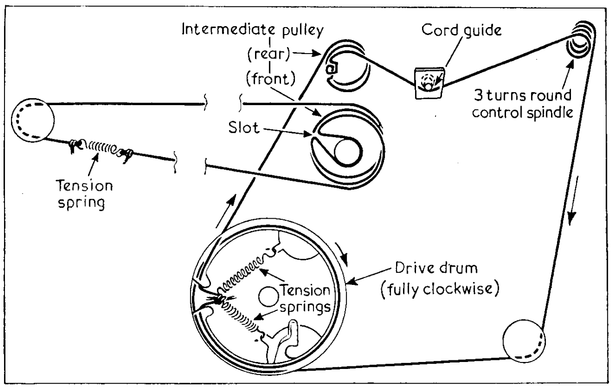
General notes

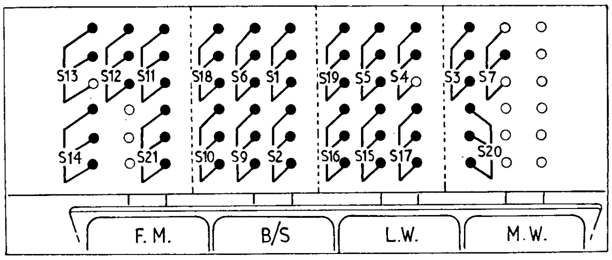
Dismantling. – To gain access to foil side of printed panel and drive cord assembly. Pull off volume and tuning control knobs, remove battery compartment cover (unscrew three captive screws), unscrew and remove three Philips screws securing back cover and remove back cover. Unplug telescopic aerial lead, unsolder lead to a.m. aerial socket at the socket, slacken cord clamp on cursor, and slide out jack assembly.

Unscrew and remove two Philips screws 'A' and four pillars 'B' (see illustration). *Note spacing washer under centre pillar.* The chassis may now be lifted out of the case. When reassembling take care not to trap any leads under the stand-off pillars.

Drive cord replacement. – To replace drive cord(s) remove chassis as described under dismantling. Then with tuning at a minimum capacitance route the replacement cord(s) as illustrated. When refitting cursor, rotate tuning gang to maximum capacitance, set cursor to left-hand marker on f.m. tuning scale and secure cord clamp.

Preset adjustments. – With no signal input **VR1** should be adjusted for 0·2V across **R2.** Adjust **VR2** for 0·4V across **R19.**





Above: Waveband switches as seen from front of the receiver.

Left: Sketch of the drive cord assembly with the tuning gang at minimum capacitance.

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